

Daniel (1981), discussing flow sources and relationships in peatlands, makes supporting observations of the correlation between vegetation types and the predominant direction and source of water movements. He links the swamp forest vegetation type directly with relatively nutrient-rich groundwater, stream and surface flows into peatlands which are topographically situated to receive such flows; while interstream peatlands elevated above the surrounding terrain receive water only from nutrient-poor precipitation. Otte (pers. comm., 1982), based on field surveys and laboratory peat analyses conducted on the Alligator River peat deposits, feels that the swamp forests occupy locations which are or have been subject to flooding by sediment-laden waters backing up the Alligator River and Whipping Creek during major flooding events in the Albemarle Sound/Roanoke River system, with the resulting sediment and nutrient input maintaining the swamp forest community as predicted by his and Daniel's hypothesis. Otte's data demonstrate that the mineral content in peat is greatest close to the river, an expected pattern if river flooding provides sediment to the system. The topographic arrangement of the Dare County peatlands is consistent with Otte's view. Many of the thick peat deposits are not domed, but instead are associated with the Alligator River and its tributaries (Otte and Ingram, 1980; Ingram and Otte, 1982), where they are theoretically subject to some nutrient/mineral influx. Mineral transport in the Alligator River swamp forests is a complex phenomenon, and other transport agents besides flooding from the river may be involved. Clearly flooding does not occur with the same regularity and high visibility seen on brownwater rivers. Topographically and hydrologically, however, the Dare County swamp forest sites appear to be integrated with the regional drainage, rather than isolated as are pocosin sites further to the east.

One question which may be asked is whether the land-clearing activities of man have in the past three centuries tended to favor swamp forests locally on peats by increasing stream sediment loads and thus nutrient influx. Otte (pers. comm., 1982), without proposing an answer to this elusive problem, has noted an increased mineral content in the extreme upper layer of peats he has sampled which may be subject to flooding; and he attributes this to such human activity. At the same time the direct effect of logging and clearing for agriculture has been to reduce the extent of the swamp forest community throughout the peatlands of North Carolina (Ashe and Pinchot, 1897; Kologiski, 1977; Christensen, et al., 1981; Daniel, 1981). Generally, in the Alligator River system, most of the thick peat contains abundant wood throughout the profile, indicating the swamp forests were present prior to any historical period of increased sedimentation due to upstream disturbance by man (Otte, pers. comm., 1982).